

$$\frac{c}{b} = \frac{b}{e} \quad \frac{d}{a} = \frac{a}{c}$$

$$b^2 = ce \quad a^2 = cd$$

$$ce + cd = b^2 + a^2$$

$$c(e+d) = b^2 + a^2$$

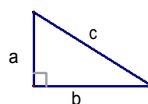
$$c \cdot c = b^2 + a^2$$

$$c^2 = a^2 + b^2$$

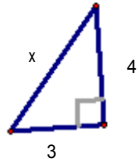
## 7.2 The Pythagorean Theorem

Thm 7.4--The Pythagorean Theorem--In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the legs

$$c^2 = a^2 + b^2$$



President Garfield

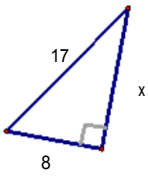


$$x^2 = 3^2 + 4^2$$

$$\sqrt{x^2} = \sqrt{9+16}$$

$$\sqrt{x^2} = \sqrt{25}$$

$$x = 5$$



$$17^2 = 8^2 + x^2$$

$$289 = 64 + x^2$$

$$\begin{array}{r} 289 \\ -64 \\ \hline \end{array} = x^2$$

$$\sqrt{225} = \sqrt{x^2}$$

$$15 = x$$

Find the diagonal of the rectangle  
with width of 2 and a length of

$$2\sqrt{2}$$



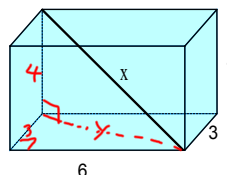
$$x^2 = 2^2 + (2\sqrt{2})^2$$

$$= 4 + 4 \cdot 2$$

$$\sqrt{x^2} = \sqrt{12}$$

$$x = 2\sqrt{3}$$

Rect. Prism



$$x^2 = 4^2 + \sqrt{45}^2$$

$$\sqrt{x^2} = \sqrt{16 + 45}$$

$$x = \sqrt{61}$$

$$y^2 = 3^2 + 6^2$$

$$9 + 36$$

$$y^2 = 45$$

$$y = \sqrt{45}$$

### Pythagorean Triples

3 4 5

5 12 13

8 15 17

7 24 25

6 8 10

10 24 26

9 12 15

Theorem 7-5 The Converse of the Pythagorean Theorem--If the square of one side of a triangle is equal to the sum of the squares of the other two sides, then the triangle is a right triangle.

If  $c^2 = a^2 + b^2$ , then Right  $\triangle$

If  $c^2 > a^2 + b^2$ , then Obtuse  $\triangle$

If  $c^2 < a^2 + b^2$ , then Acute  $\triangle$

$c$  is the largest side.

Examples

3, 7, 8  
obtuse  $8^2 \text{ (} > \text{)} 3^2 + 7^2$   
64 9 + 49  
58

8, 16, 17  
acute  $17^2 \text{ (} < \text{)} 8^2 + 16^2$   
289 64 + 256

$\sqrt{5}$   $\sqrt{20}$  6 obtuse  
5 20 36  
 $36 \text{ (} > \text{)} 5 + 20$

What type of triangle is ABC?  $\Delta$ 

A(-9, -3)

B(1, -1)

C(-3, -7)

$$AB = \sqrt{\underbrace{(-9-1)^2}_{100} + \underbrace{(-3-(-1))^2}_{4}} = \sqrt{104}$$

$$BC = \sqrt{\underbrace{(1-(-3))^2}_{16} + \underbrace{(-1+7)^2}_{36}} = \sqrt{52}$$

$$AC = \sqrt{\underbrace{(-9+3)^2}_{36} + \underbrace{(-3+7)^2}_{16}} = \sqrt{52}$$

$$\sqrt{104}^2 \text{ (} = \text{)} \sqrt{52}^2 + \sqrt{52}^2$$

Right  $\Delta$ .

HW

p354

12-19, 22-29 (Is it right, obtuse, or acute?)